

REMARKS

After entry of this amendment, claims 1, 3, 7-9, 11, 14, 16, 17, 19, 20, 23, 25, 28 and 29 are pending. New claims 28 and 29 have been added and find support *inter alia* in the original claims. No new matter has been added.

Claim Rejection – 35 U.S.C. § 103

Claims 1, 3, 7-9, 11, 14, 16-17, 19-20, 23 and 25 remain rejected under 35 U.S.C. § 103(a) as being obvious over Simmons *et al.* (hereinafter “Simmons”) in view of Hüchelhoven *et al.* (hereinafter “Hüchelhoven”), Sonnewald *et al.* (hereinafter “Sonnewald”), and Nelson *et al.* (hereinafter “Nelson”). In addition to Simmons and Hüchelhoven as cited in the previous Office Action, the Examiner further relies on Sonnewald and Nelson in the present Office Action to support the finding of obviousness.

The teaching of Simmons and Hüchelhoven has been discussed in the previous response and is expressly incorporated herein. Essentially, while these references make a general mention of tissue specific expression, there is no disclosure which directs specifically towards mesophyll-specific expression. The Examiner cites Sonnewald and Nelson as support that it would have been obvious to express BII in a mesophyll-specific manner using a mesophyll-specific promoter.

Sonnewald discloses leaf-specific gene expression in transgenic plants. The promoter disclosed in Sonnewald is a mesophyll-specific promoter. As the Examiner has noted, there is a general disclosure which suggests leaf expression of disease resistance genes. There is no disclosure to express a Bax inhibitor protein under control of a mesophyll-specific promoter.

Nelson examined the respective roles of the epidermis and mesophyll in the resistance of barley to powdery mildew. Nelson’s experiments suggested that the resistance reaction of barley to powdery mildew occurs mainly in the epidermis, while the mesophyll may play a supportive role in the defense mechanism. See Abstract and Discussion at page 159, 1st paragraph.¹

¹ Nelson’s conclusions were made based on experiments combining the epidermal layer of a powdery mildew susceptible variety with the mesophyll layer of a powdery mildew resistant variety and *vice versa*. As shown in Fig. 3 at page 158, placing the susceptible epidermis on resistant mesophyll reveals no difference in resistance as compared to placing susceptible epidermis on susceptible mesophyll (see Fig. 3, H/H vs. H/N). However, an epidermal layer from a resistant variety retains resistance even when it was placed on a mesophyll

Contrary to the position expressed by the Examiner, these results do not suggest or motivate expression of Bax inhibitor proteins only in the mesophyll. A more logical inference is that a Bax inhibitor should be expressed in the epidermis, or, in both the epidermis and the mesophyll, which teaches away from the subject matter being claimed here.

Since the prior art provides no motivation to make the claimed invention, the subject matter is not *prima facie* obvious, and the rejection should be withdrawn for that reason alone.

Subject matter which is *prima facie* obvious can be legally unobvious based upon unexpected or surprising properties. Here, Applicants found that, when BII is expressed in a mesophyll-specific manner, the desired disease resistance is obtained without loss of the mlo resistance phenotype. As is clear from the record, this finding is totally unexpected in view of the prior art. While inherent, unrecognized properties are not evidence of novelty in an anticipation analysis, the unexpected properties of a product or process are evidence of nonobviousness in an analysis under 35 U.S.C. §103. See e.g., *In re Dillon*, 16 USPQ 2d 1897, 1901 (Fed. Cir. 1990) (subject matter which is *prima facie* obvious can be legally unobvious based on unexpected properties).

Moreover, Applicants maintain their view that recognition of the loss of the mlo resistance phenotype is the discovery of a particular problem within the meaning of *In re Sponnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969). By recognizing this specific problem, Applicants found an unobvious method to generate or increase resistance to plant pathogens without loss of the mlo resistance phenotype. As stated in *Sponnoble*, even though the solution to a problem may be obvious in hindsight, the discovery of a problem can be part of an

layer of a susceptible variety (see Fig. 3, H/H vs. N/H). Based on the above observation, Nelson suggests that the resistance reaction of barley to powdery mildew infection occurs mainly in the epidermis. See Nelson at page 159, 1st paragraph. Applicants point out that this observation might also suggest that the mesophyll has no influence on the resistance of barley to powdery mildew infection.

The suggestion that mesophyll has a supporting role is made based on the observation that the infection frequency was higher on the composite section with an epidermis and mesophyll of the same type than on the respective intact section. To explain this phenomenon, it is suggested that the communication and transport between the epidermis and mesophyll are disrupted by the process of stripping off the epidermis to the extent that materials from the mesophyll necessary for resistance to powdery mildew cannot reach the epidermis. Thus, according to Nelson, leaf mesophyll cells of barley may provide some materials that are necessary for resistance to powdery mildew. See Nelson at page 159, 2nd paragraph.

unobvious invention. *See also, KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1742 (2007) (“[o]ne of the ways in which a patent’s subject matter can be proved obvious is by noting that there existed at the time of invention a *known problem* for which there was an obvious solution encompassed by the patent’s claims”) (emphasis added).

Because the references cited by the Examiner, alone or in combination, do not provide a motivation to make the claimed invention, a *prima facie* case of obviousness is not established. Assuming *arguendo* that there was a motivation, the claimed subject matter is nonetheless legally unobvious because of the unexpected or surprising properties in preserving the mlo resistance phenotype while overexpressing BI1 in a mesophyll-specific manner. Additionally, because the specific problem discovered by Applicants was not known in the art, this further supports the notion that the claimed subject matter is nonobvious.

For at the above reasons and for the reasons already of record, reconsideration and withdrawal of the rejection is respectfully requested.

Separate consideration to new claim 28 is respectfully requested. As discussed in the specification, overexpression of BI1 in mammalian cells suppresses the proapoptotic effect of BAX, while inhibition of BI1 induces apoptosis. Page 3, lines 31-35. Because similar result is observed in plants when BI1 is overexpressed (see page 3, lines 41-43), one of ordinary skill in the art would reasonably expect that apoptosis would be induced when the expression of BI1 is reduced. Thus, in an attempt to generate or increase resistance to a plant pathogen in a plant, one skilled artisan would not have been motivated to reduce the expression of BI1 in any tissue including epidermis. For the same reason, one skilled in the art would not have a reasonable expectation of success that the resistance to a plant pathogen would have been generated or increased when the BI1 expression is reduced in leaf epidermis. Accordingly, reconsideration and allowance of the claims is respectfully requested.

CONCLUSION

For at least the above reasons, Applicants respectfully request withdrawal of the rejections and allowance of the claims. If any outstanding issues remain, the Examiner is invited to telephone the undersigned at the number given below.

Applicants reserve all rights to pursue the non-elected claims and subject matter in one or

more divisional applications, if necessary.

Applicants are submitting their response within the three-month response period. No fee is believed due. However, if a fee is due, the Director is hereby authorized to charge or credit our Deposit Account No. 03-2775, under Order No. 12810-00137-US from which the undersigned is authorized to draw.

Respectfully submitted,

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